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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,108	12/03/2003	Siaw Kiang Chou	040184.000200US	7629

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EXAMINER	
BARTON, JEFFREY THOMAS	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
12/18/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/728,108	CHOU ET AL.	
	Examiner	Art Unit	
	Jeffrey T. Barton	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 October 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The amendment filed on 2 October 2007 does not place the application in condition for allowance.

Status of Rejections Pending Since the Office Action of 02 July 2007

2. The rejection of claims 1 and 12 under 35 U.S.C. §102(b) as anticipated by Zuppero et al is withdrawn due to Applicant's amendment.

3. All other rejections are maintained.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. Claim 16 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. There is no disclosure of a generator, "wherein said combustion chamber comprises porous material for transmitting excess heat from combustion to said micromixer". There is no teaching of a porous material anywhere in the specification as originally filed.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 13, 14, and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Kovacik et al. (US 2006/0107995)

Kovacik discloses a thermophotovoltaic generator as shown in figure 3.

Regarding claims 1 and 18, figure 3 shows the generator comprising a combustion chamber which comprises an internal chamber, 24 and 26, with an expansion step (Step is immediately above tube 26 as illustrated in Figure 3), an emitter 28 engaged around the internal chamber and formed as a part of the outer wall of the combustion chamber, and a photovoltaic cell 14 in proximity to the emitter, configured to generate an electric current.

Regarding claims 13 and 14, the internal chamber (24 and 26) comprises first (26) and second (Directly above 26 in Figure 3) tubular sections, wherein the first section 26 has a cross-sectional width and diameter greater than those of the second section.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 2-12 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kovacik in view of Gardner et al. (U.S. 6,786,716).

The disclosure of Kovacik is as stated above in addressing claim 1.

Regarding claims 3 and 4, figure 3 of Kovacik shows a cylindrical outer wall for the combustion chamber and a backwards facing step immediately above section 26.

Regarding claims 5-7, Kovacik discloses that the emitter is matched to the characteristics of the solar cell (paragraphs 0027-0030), discloses use of SiC as a possible emitter (paragraph 0027) and discloses emitters made of magnesia oxide (MgO) doped with a d-series transition element (paragraph 0029). Cobalt and Nickel are d-series transition elements and thus the emitter of claim 6 is disclosed by Kovacik.

Regarding claim 8, Kovacik discloses the use of a filter, 16, between the emitter and the solar cell (paragraph 0031).

Regarding claim 9, Kovacik discloses the use of glass and dielectric filters, including multiple layers of dielectric materials (paragraphs 0033 and 0035).

Regarding claim 10, Kovacik discloses GaSb photovoltaic cells (paragraph 0029).

Regarding claims 11 and 12, Kovacik discloses burner design dependent on the type of fuel utilized.

Regarding claim 17, Kovacik discloses SiC being used to form portions of the combustion chamber. (Paragraphs 0013 and 0027)

The differences between Kovacik and the claims include the use of a platinum catalyst and the size of the device.

Gardner teaches a microcombustor as shown in figure 1 that utilizes platinum catalyst on the inside walls of the combustion chamber (column 7, lines 49-51).

Gardner also teaches the microcombustor can have sizes less than a millimeter (column 5, paragraph 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the combustion size and platinum catalyst of Gardner within the combustion chamber of Kovacik because the microcombustor allows for lean burning at low flames and at temperatures less severe than with diffusion flames, thus enabling a longer system lifetime, reduced fuel consumption, and portable applications (Gardner column 3, paragraph 2) and the catalyst enables flame stabilization in the microsystem, permits combustion with lean fuel/air mixtures, lowers the combustion temperature and extends materials limits of flammability (Gardner column 3, paragraph 2). Because Gardner and Kovacik are both concerned with combustion systems, one would have a reasonable expectation of success from the combination.

Regarding claim 9, as Kovacik disclosed, the choice of layers within the filter depends on the specific filter performance required for a specific application. It would have been further obvious to choose a specific number of layers as within the claim and to use the specific materials of the claim as SiO_2 is a known dielectric and both Si and SiO_2 are within the glass disclosed by Kovacik.

Regarding claims 11 and 12, the choice of fuel and operating pressures are dependent on the specific application and would be obvious to one skilled in the art to make such choices. Further the small diameters of the claims are taught by Gardner for microcombustion systems and would be obvious to choose such diameters for the reasoning given above pertaining to microcombustion advantages.

12. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kovacik et al and Gardner et al as applied to claims 2-12 and 17 above, and further in view of DePoy et al. (US 6,043,426)

Kovacik et al and Gardner et al teach a generator as described above in addressing claims 2-12 and 17.

Neither Kovacik et al nor Gardner et al teaches a system comprising InGaSb or InGaAsSb thermophotovoltaic cells.

DePoy et al teach a TPV system using heavily doped InGaSb or InGaAsSb cells (Column 2, lines 19-23; Column 5, lines 8-14)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Kovacik et al and Gardner et al by replacing the cells with heavily doped InGaSb or InGaAsSb cells, as taught by DePoy et al, because DePoy et al teaches that these cells provide improved efficiency and open-circuit voltage, among other advantages. (Abstract, Column 5, lines 8-14)

13. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kovacik et al and Gardner et al as applied to claims 2-12 and 17 above, and further in view of Noreen. (US 5,512,108)

Kovacik et al and Gardner et al teach a generator as described above in addressing claims 2-12 and 17.

Neither Kovacik et al nor Gardner et al teaches a system comprising porous material for transmitting excess heat from combustion to the mixer.

Noreen teaches heat exchangers comprising microscale passages (Figures 6a and 6b; Column 13, lines 11-39) for transferring heat from exhaust gases to incoming fuel and air. It is the Examiner's position that mixing will inherently occur in such a system.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Kovacik et al and Gardner et al by providing a heat exchanger as taught by Noreen, because Kovacik et al suggest providing heat recovery means (Paragraph 0025) and because Noreen teaches that such heat exchangers aid in achieving constant emitter temperature and reducing heat loss from the system (Column 12, line 45 - Column 13, line 39), which increases overall efficiency.

Response to Arguments

14. Applicant's arguments filed 02 October 2007 have been fully considered but they are not persuasive.

Applicant argues that Kovacik et al do not teach the instant expansion step. The Examiner respectfully disagrees. As illustrated in Figure 3, the internal chamber of the combustion chamber of Kovacik et al includes such a step directly above tube 26. As the claimed structure is the same as that taught by the prior art, the claim is anticipated.

Applicant further argues that the cited prior art do not teach the limitations of new claims 15, 16, and 17. The Examiner points out that the limitations of claim 16 are not supported by the original disclosure, as pointed out above in the rejection under 35 U.S.C. §112, first paragraph. New references are cited in the rejections of claims 15 and 16 under 35 U.S.C. §103(a). The Examiner disagrees regarding claim 17, and maintains that the chamber of Kovacik et al comprises SiC, as disclosed in paragraphs 0013 and 0027 of the reference.

Regarding claim 2, Applicant argues that the effect of the Gardner catalyst is not the same as the instant catalyst. Such considerations are immaterial to the rejection, since there are no limitations related to such an "effect" in the instant claims. The claim requires a Pt catalyst, and Gardner teaches the benefit of such a catalyst. The motivation is proper, and the combination meets all limitations of claim 2.

Applicant further argues that the Kovacik et al and Gardner et al references are not combinable, since they relate to different fields. This is not persuasive because both references are drawn to thermophotovoltaic generators. They are clearly within the same field. Applicant further argues that the Gardner reference relates to a different field of technology than the instant invention. This is irrelevant. If the system taught by the prior art meets the claim limitations, the claim is not patentable, regardless of the intended use of the system.

Applicant further argues a distinction between "macro TPV devices" and "micro TPV devices", in arguing that the "macro" device of Kovacik et al is not combinable with the "micro" device of Gardner. This is not persuasive, because Kovacik et al suggests

providing small dimensions to the system (Paragraph 0025), and is otherwise silent concerning the overall dimensions. There is no evidence beyond Applicant's assertion that the fields are separated by anything other than somewhat reduced dimensions, which are in fact suggested by Kovacik et al. The principles of operation of Kovacik et al and Gardner et al are fundamentally the same, and the combination is therefore considered to be proper.

Conclusion

15. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Jeffrey T. Barton whose telephone number is (571) 272-1307. The examiner can normally be reached on M-F 9:00AM - 5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JTB
11 December 2007

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